

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

ST

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,955	02/26/2002	Jason Barnabas Langhorn	CTS-2287	5009

29184 7590 05/21/2003

CTS CORPORATION  
905 W. BLVD. N  
ELKHART, IN 46502

EXAMINER

GEBREMARIAM, SAMUEL A

ART UNIT	PAPER NUMBER
----------	--------------

2811

DATE MAILED: 05/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/082,955	LANGHORN, JASON BARNABAS
Examiner	Art Unit	
Samuel A Gebremariam	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1)  Responsive to communication(s) filed on 11 March 2003.

2a)  This action is FINAL.                    2b)  This action is non-final.

3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## **Disposition of Claims**

4)  Claim(s) 1-21 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5)  Claim(s) \_\_\_\_\_ is/are allowed.

6)  Claim(s) 1-21 is/are rejected.

7)  Claim(s) 10 is/are objected to.

8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

9)  The specification is objected to by the Examiner.

10)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)  The proposed drawing correction filed on \_\_\_\_\_ is: a)  approved b)  disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)  The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All b)  Some \* c)  None of:  
1.  Certified copies of the priority documents have been received.  
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

14)  Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a)  The translation of the foreign language provisional application has been received.

15)  Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1)  Notice of References Cited (PTO-892) 4)  Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_ .  
2)  Notice of Draftsperson's Patent Drawing Review (PTO-948) 5)  Notice of Informal Patent Application (PTO-152)  
3)  Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 . 6)  Other: \_\_\_\_\_ .

## DETAILED ACTION

### ***Election/Restrictions***

1. Applicant's election without traverse of group I, claims 1-21 drawn to a semiconductor device in Paper No. 4 is acknowledged.

### ***Claim Objections***

2. Claim 10 is objected to because of the following informalities: the phrase "according to claim 10" appears to be a typographical error. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

4. Claims 1, 5, 10 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Glenn, US patent No. 6,214,644.

Regarding claim 1, Glenn teaches (fig. 4) a semiconductor package for a micro-machined semiconductor device, comprising: a) a substrate (408) having a first surface (408U) and a second surface (408L), the micro-machined semiconductor (402) device located adjacent the first surface (408U); b) a plurality of vias (414), extending through the substrate between the first and second surfaces; c) an electrical connection (traces 410 connect the vias 414 to the 402 through 412) located between the vias and the

micro-machined semiconductor device for electrically connecting the vias to the semiconductor device; d) a seal, located between the micromachined semiconductor device and the first surface for hermetically sealing the micro-machined semiconductor device (col. 6, lines 43-52); f) a plurality of solder spheres (420) mounted to the second surface (408L) and electrically connected to the vias (414).

The package (424) and (412) inherently serve as a rigid support located between the micro-machined semiconductor device (404) and the first surface (408U) for supporting the micro-machined semiconductor device during assembly.

Regarding claim 5, Glenn teaches the entire claimed structure of claim 1 above including the rigid support (424 and 412) is attached to the first surface (408U).

Regarding claim 10, Glenn teaches the entire claimed structure of claim 1 above including a plurality of circuit lines (410, 410A) located on the layers, the circuit lines connected between vias (414A, 414).

Regarding claim 11, Glenn teaches the entire claimed structure of claim 1 above including a ball pad (418) is attached to the second surface (408L), the solder sphere (420) attached to the ball pad.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 2-4, 9, and 12-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glenn in view of Hinds EP, 1057779A2.

Regarding claim 2, Glenn teaches substantially the entire claimed structure of claim 1 including a first pad (406) located on the micro-machined semiconductor device; and a second pad (410) located on the first surface (408U).

Glenn does not teach explicitly teach a solder joint between the first and second pad.

It is conventional and also taught by Hinds forming solder joints (50, fig. 3) between pads.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the solder joint structure taught by Hinds in the structure of Glenn for improved bonding strength.

Regarding claim 3, Glenn teaches substantially the entire claimed structure of claim 1 including the substrate is ceramic (col. 5, lines 19-23).

With regard to the limitation that the substrate is a low temperature co-fired ceramic, is considered to be a product-by-process claim. “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Regarding claim 4, Glenn teaches substantially the entire claimed structure of claim 1 above including the seal is a ring of solder located adjacent an outer perimeter of the substrate (figs 2 and 3, col. 4, lines 12-27, Hinds).

Regarding claim 9, Glenn teaches substantially the entire claimed structure of claim 1 above including the substrate has a plurality of layers (fig. 2, Hinds).

Regarding claim 12, Glenn teaches substantially the entire claimed structure of claim 1 above including the solder sphere is attached to the ball pad by a reflowed solder paste (col. 3, lines 45-47, Hinds).

Regarding claims 13-15, and 19-21, Glenn teaches substantially the entire claimed structure of claims 1, 3 and 9 above including the micro-machined semiconductor device is spaced from the top surface by the rigid supports such that a movable portion of the micro-machined semiconductor device is unconstrained for movement (col. 6, lines 45-52); and an electrical connection (410) located between the vias (414A, 414) and the micro-machined semiconductor device for electrically connecting the vias to the semiconductor device.

Claims 5-8 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glenn, Hinds and in view of Pasch US patent No. 5,700,715.

Regarding claims 5, 6, 16 and 17, Glenn teaches substantially the entire claimed structure of claims 1, 5 and 13 above except explicitly stating that the rigid support is gold, or alloy of gold and palladium.

Pasch teaches (fig. 2a) forming pillar structures (240) that either conducting or insulating for use as support structure in the event the solder bumps collapse.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the conductive pillar structure taught by Pasch in the structure of Glenn in order to form support structure.

Since gold, alloy of gold and palladium are conductors, it would have been obvious to one of ordinary skill in the art at the time the invention was made to experiment with claimed materials in the structure of Glenn in order to form support structure.

Regarding claims 8 and 18, Glenn teaches substantially the entire claimed structure of claims 1 and 16 above except explicitly stating that the rigid support is ultrasonically deposited.

The limitation that the rigid support is ultrasonically deposited is considered to be a product-by-process claim. “[E]ven though product-by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

### **Conclusion**

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel Admassu Gebremariam whose telephone number is 703 305 1913. The examiner can normally be reached on Monday-Friday.

Art Unit: 2811

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Samuel Admassu Gebremariam  
May 18, 2003

*Sam* *Loke*